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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Lutz Weber

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EXAMINER

FREAY, CHARLES GRANT

ART UNIT

PAPER NUMBER

3746

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/527,207	Applicant(s) WEBER, LUTZ	
	Examiner Charles G. Freay	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on May 12, 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 12, 2009 has been entered.

Claim Objections

Claims 1, 5 and 20 are objected to because of the following informalities:

In claim 1 lines 1 and 2 the claims sets forth that the membrane can be moved by modifying the volume of the pump chamber, but it is clear that the membrane is moved to modify the volume of the pump chamber, not the other way around;

In claim 1 line 12 the "." Should be deleted;

In claim 5 lines 5 and 6 the "wherein clause is redundant since all of this material has already been set forth in the independent claim, the examiner suggest deleting this phrase; and,

In claim 20 line 2 after "or" "with" should be inserted.

. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims are vague and indefinite because in claim 5, from which claims 6-11 depend, in the 4 the opening is set forth as being “preferably central”. It is unclear if the opening is required to be centrally located.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8, 11, 12 and 17-21 are Claim rejected under 35 U.S.C. 103(a) as being unpatentable over Suga et al (USPN 4,514,742) in view of Tomita et al (USPN 6,116,866) and Zahid (USPN 3,881,519).

In Reference to Claim 1

Suga et al. teach a micropump (see figure 2) with a pump membrane (wall (12)) which is moved to modify the volume of a pump chamber (pressure chamber (13)) which is adjacent to the pump membrane and a base part (printer head (10) serves as a base for mounting the wall), also comprising two valves (first and second fluid control means (21 and 22)) which are arranged in recesses in the base part (as shown in figure 2) and react to the pressure in the pump chamber in order to alternately open and close an inlet channel and an outlet channel (nozzle and supply passage (14 and 15)) for a medium to be pumped, wherein the valves are formed without any common components by standalone functioning valve modules comprising a valve seat (valve seat (404)) and a valve body (401) (see module in figures 4C and 5C, and also Note Fig. 7B which shows the valve module directly sliding into the recess.

Suga et al do not disclose the seat component having a recess formed by a rim heightening which projects from the floor plate in the flow through direction or that the spring component has a side facing away from the floor plate which is entirely free.

Tomita et al discloses a similar diaphragm pump having a casing with inlet 8 and outlet 9 ports. There is a valve module including valve seat 4 which has a recess (for example the opening on the opposite side of path 3 in Fig. 1) formed by a rim heightening which projects from the floor plate in the flow through direction. As shown in Figs. 2 and 3a-c there is a spring component centered in and by the recess. The valve includes an annular portion and a central flap/spring portion. In Fig. 2 Tomita et al shows the spring element located on the surface. Fig. 2 would suggest but does not specifically teach that the valve is secured to the seat and the opposite side is entirely

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free. Zahid specifically shows a similar valve element having a seat 21 (in Fig. 2) and a spring element 51 having one side bonded to the seat and the other side (the downstream side of the valve) being completely free.

At the time of the invention it would have been obvious to one of ordinary skill in the art to form each of the independent valve modules of Suga et al of a seat and spring element as set forth by Tomita et al as a simple valve module with excellent sealability and closing performance (see col. 2 lines 37 and 38). Furthermore it would have been obvious to secure the spring element of Tomita et al to its valve seat as taught by Zahid as bonding is a simple way to securely attach the elements together.

In Reference to Claim 2

Suga et al. teaches the micropump according to claim 1 (see the rejection of claim 1 above), wherein both valve modules are identically constructed (both valves can take the form of the embodiments shown in figures 3-10).

In Reference to Claim 3

Suga et al. teach the micropump according to claim 1 (see the rejection of claim 1 above), wherein hollows which are open toward the pump chamber are formed as recesses (See figure 2, where two recesses are used to hold the valves (22 and 21)).

In Reference to Claim 4

Suga et al. teach the micropump according to claim 3 (see the rejection of claim 3 above), wherein the height of the valve module is equal to the depth of the hollow receiving the module (See figure 2, where the top of the valves (22 and 21) sit flush with

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the inner chamber of the base (pressure chamber (13)) in which the recesses are formed).

In Reference to Claim 5

Suga et al. teach the micropump according to claim 1 (see the rejection of claim 1 above), wherein the valve module (see figure 5C) is comprised of two parts with a rotationally symmetrical seat component (seat component (506) is rotationally symmetric about its central axis), and a valve body (valve member (511)) for closing and opening of a central opening in the seat component (see figures 5A and 5B).

Tomita et al also teaches that the valve is symmetrical to a central opening.

In Reference to Claim 6

Suga et al. teach the micropump according to claim 5 (see the rejection of claim 5 above), wherein the spring component exhibits a film (the spring component (511) can be made from a plastic film (see column 5 lines 52-58)) in which a lip element (supporting arms (510)) is formed through at least one cutout (the portions of film that have been cutaway) and attached at one end or at several ends with the remaining film (the arms are attached to the center of the film and an outer rim of the film, see figure 5C). Tomita et al also teaches the valve is formed as a cutout and is attached at a single end to the rest of the valve.

In Reference to Claim 7

Suga et al. teach the micropump according to claim 6 (see the rejection of claim 7 above), wherein the cutout is a slot cutout following the contour of the lip element (The

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slots meet the edges of the lips (supporting arms (510)), and therefore follow the contour of the lips).

In Reference to Claim 8

Suga et al. teach the micropump according to claim 6 (see the rejection of claim 6 above), wherein the spring component is connected with the seat component in an outer ring area (peripheral stationary ring (503)) which is centered by the seat component, from which the lip element extends inwards (see figure 5C).

In Reference to Claim 11

Suga et al. teach the micropump according to claim 8 (see the rejection of claim 8 above), wherein the lip element is connected with the ring area at two diametrical places or connected with the ring area at three places which are evenly distributed across the ring area (The lip elements connect to the ring four times in such a way that each connection has a connection that is diametrically opposite).

In Reference to Claim 12

Suga et al. teach the micropump according to claim 1 (see the rejection of claim 1 above), wherein it is composed of a base module (printer head (10)) which receives the valve modules (see figure 2 with valve modules (21 and 22)) and comprises a base part (bottom of pressure chamber (103)) and hose connections (nozzle and supply passage (14 and 15) could be connected to hoses), and of a actuator module which includes the membrane and a piezo disk (piezo electric element (11)) connected to the membrane (wall (12)).

In Reference to Claim 17

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Suga et al. teach the micropump according to claim 1 (see the rejection of claim 1 above), wherein at least the part of the pump which comes into contact with the medium is made of a plastic (Suga et al. teach that the valves can be made from a plastic film (see column 5 lines 52-58)).

In Reference to Claim 18

Suga et al. teach the micropump according to claim 1 (see the rejection of claim 1 above), wherein the membrane is made of one piece or exhibits several layers of different material. The wall is made of a cold-rolled stainless steel plate (see column 5 lines 64-65).

In Reference to Claim 19

Suga et al. teach the micropump according to claim 1 (see the rejection of claim 1 above), wherein the membrane exhibits a recess facing the pump chamber, which preferably corresponds to the maximum pump chamber volume (When a voltage is applied to the piezoelectric element, the wall is curved and deformed, which would form a recess facing the pump chamber (see columns 2-3, lines 64-2)).

In Reference to Claim 20

Suga et al. teach the micropump according to claim 1 (see the rejection of claim 1 above), wherein the membrane is cap-like and can be moved manually or with the help of an actuation which is temporarily or permanently attached to the membrane (The membrane forms a cap for the pressure chamber (103) and is moved by a electromechanical transducer means (101) which is fastened to the wall (102) (see columns 2-3 lines 64-2)).

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In Reference to Claim 21

Suga et al. teach a method for the serial production of micropumps according to claim 1 (see the rejection of claim 1 above), wherein the valve modules, base modules, which include the base part and connections, as well as the actuator modules which include the membrane, are prefabricated independently of one another and wherein the micropump is made up of these modules (The valves shown in figures 4C and 5C are created separately from the base (103), which is created separately from the wall (102) and piezo actuator (102). These components are then assembled together to form the apparatus).

2. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suga et al. in view Tomita et al and Zahid as applied to claims 1 and 5 above and further in view of U.S. Patent 4,966,185 to Schram (Schram).

In Reference to Claim 9

Suga et al. in view Tomita et al and Zahid teach the micropump according to 5 (see the rejection of claim 5 above), but does not teach that the center of the valve seat has a raised portion.

Schram teaches a similar style valve (see figure 6A) where a center portion of the valve base (outer plate (4)) is raised around the around the central valve body portion (18). It would have been obvious to one of ordinary skill in the art at the time of invention to raise the central portion of the valves of Suga et al. in the manner of Schram to ensure that the valves remain closed when not experiencing fluid pressure and to prevent leakage of the pumped fluid.

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In Reference to Claim 10

Suga et al. as modified by Schram teaches the micropump according to claim 9 (see the rejection of claim 9 above), wherein the seat component has an elevated rim seat by means which the lip element is lifted across its entire length from the floor plate (see figure 6A of Suga et al. where the lower valve seat (604) elevates the film with respect to the inner portion of the valve seat (606)).

3. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suga et al. in view Tomita et al and Zahid as applied to claims 1 and 12 above and further in view of U.S. Patent 5,718,567 to Rapp et al. (Rapp et al.).

In Reference to Claim 13

Suga et al. in view Tomita et al and Zahid teach the micropump according to claim 11 (see the rejection of claim 11 above), but do not specify the shape of the base module.

Rapp et al. teach a similar diaphragm pump where the base surrounds a disk shaped diaphragm (see diaphragm (2) shown in figure 3a). Because of this, the lower pump body (1) and the upper pump body (3) are both annular in shape and rotationally symmetric about the center of the diaphragm. It would have been obvious to one of ordinary skill in the art at the time of invention to form the base of Suga et al. in the shape of a circle so that it could be used in conjunction with a circular pumping wall or diaphragm.

In Reference to Claim 14

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Suga et al. in view Tomita et al and Zahid teach the micropump according to claim 1 (see the rejection of claim 1 above) where the base part has a disk place (the upper rim of the printer head (10), where the pump membrane disk (12) is secured to the pump body), but do not teach that the base is disk shaped, or that the inlet and outlet channel extend perpendicularly to the plane of the disk.

Rapp et al. teach a similar diaphragm pump where the base surrounds a disk shaped diaphragm (see diaphragm (2) shown in figure 3a). Because of this, the lower pump body (1) and the upper pump body (3) are both annular in shape and rotationally symmetric about the center of the diaphragm. It would have been obvious to one of ordinary skill in the art at the time of invention to form the base of Suga et al. in the shape of a circle so that it could be used in conjunction with a circular pumping wall or diaphragm.

Additionally, Rapp et al. teach that the inlet and outlet channels (11 and 12) lie perpendicular to a plane defined along the bottom of the base (1). It would have been obvious to one of ordinary skill in the art at the time of invention to form the inlet and outlet channels of Suga et al. such that they extend vertically through the pump base, in the manner taught by Rapp et al., since doing so would allow excess pump fluid trapped in the channels to leak back into the tank reservoir or out through the nozzle.

In Reference to Claim 15

Suga et al. as modified by Rapp et al. teaches the micropump according to claim 13 (see the rejection of claim 13 above), wherein a seat for the actuator module is formed on the base part (upper annular ring of pressure chamber (103) forms the seat

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for wall (12), as seen in figure 2 of Suga et al.), and the pump membrane rests over a support ring on a ring shoulder located on the base part (the ring shoulder is the upper portion of the base (103)).

In Reference to Claim 16

Suga et al. as modified by Rapp et al. teaches the micropump according to claim 13 (see the rejection of claim 13 above), wherein the base module is formed in one piece with the hose connections (see figure 2 of Suga et al., where the nozzle and supply passages (14 and 15) could be used as hose connections).

Response to Arguments

Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Roussel and Tai et al disclose check valves having seats with rim heightenings which center and hold a spring element.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles G. Freay whose telephone number is 571-272-4827. The examiner can normally be reached on Monday through Friday 8:30 A.M. to 5:30 P.M..

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on 571-272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

5. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Charles G Freay/
Primary Examiner
Art Unit 3746

CGF
July 27, 2009